

REMARKS

This Amendment and Response to Non-Final Office Action is being submitted in response to the Non-Final Office Action dated February 25, 2010. Claims 1-19 are pending in the Application.

- 1) Claims 1-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Helms et al. (U.S. Pat. No. 6,236,315, hereinafter Helms) in view of Levy et al. (U.S. Pat. No. 4,355,214, hereinafter Levy).
- 2) Claims 10-17 and 19 are rejected under 35 U.S.C. §102(b) as being unpatentable over Levy.

Claims 1-2, 4, 6, 8, 10, and 14 have been amended to further clarify the subject matter which Applicants regard as the invention, without prejudice or disclaimer to continued examination on the merits. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments and the arguments presented herein, reconsideration of the Application is respectfully requested.

- 1) **Claims 1-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Helms et al. (U.S. Pat. No. 6,236,315, hereinafter Helms) in view of Levy et al. (U.S. Pat. No. 4,355,214, hereinafter Levy).**

With respect to independent Claims 1 and 8, Examiner states that Levy teaches canceling the echo in a received (reflected) signal (output signal of element 45) by combining the received signal and feedback signal (output of element 33). Examiner further states that it is a matter of design choice that the feedback signal comprises the at least a portion of radio frequency echo signals at lower frequencies than a data signal of interest. Applicants respectfully disagree and submit that Levy fails to teach or fairly suggest Applicants' reflection signal.

Importantly, Levy teaches echo cancellation for a full-duplex carrier modulation transmission system. Levy relates to simultaneous transmission of data using a single transmission channel and the same frequency for both transmission directions. Specifically, Levy's echo cancellation circuit in FIG. 3 (cited by Examiner) relates to eliminating spurious signals at a receiver produced by leakage of signal between the output of a transmitter and the input of the receiver at the same equipment.

The present invention is full-duplex in the sense that RF power is transmitted in both directions, but data is only sent in one direction, i.e. from tag to reader. Transmission from a reader to a tag includes RF power only with no data. Levy is transmitting data in both directions, and disclosing filtering out data from the transmitter to the receiver.

Examiner states in the pending Office Action that Levy teaches canceling echo signal in a received signal by combining the reflection signal and a feedback signal. Applicants respectfully disagree. Levy specifically teaches canceling an output from a transmitter from an input of a receiver (Levy, Col. 3, lines 19-30). Thus Levy is filtering not a received signal, i.e. the reflection signal, but rather the transmitted signal. Applicants, on the other hand, are filtering out a reflection signal that is has an error component comprising interrogation signal energy reflected from objects in an environment other than a radio frequency tag. Stated differently, Levy is filtering leakage from the transmitter directly to the receiver and this includes canceling data in the pass-band. Applicants, on the other hand, are filtering received reflection signals from objects other than an RFID tag. These reflection signals as noted by Applicants are mainly at lower frequencies than the data. Thus Applicants are using a feedback signal with radio frequency echo signals at lower frequencies than a data signal of interest. Levy fails to disclose, teach, or fairly suggest Applicants' claimed reflection signal.

It would not be possible for Levy to utilize a feedback signal with radio frequency echo signals at lower frequencies than a data signal of interest to cancel out leakage from the transmitter. Levy requires a feedback signal at the same frequencies as the data signal of

interest since Levy is canceling data from the transmitter at the same frequencies in the receiver, not error components at lower frequencies caused by reflections from objects in an environment. Under 35 U.S.C. 103(a), there is no suggestion or motivation to modify a reference if the proposed modification renders the prior art unsatisfactory for its intended purpose. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); MPEP 2143.01. Further, a proposed modification cannot change the principle of operation of a reference. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); MPEP 2143.01. Here, Applicants respectfully submit that using a feedback signal with radio frequency echo signals at lower frequencies than a data signal of interest in Levy would prevent Levy from operating with respect to echo cancellation. Levy is operating directly on leakage from a collocated transmitter. Thus operating Levy with a low-pass filter would remove the signals used to cancel the echo in Levy. Stated differently, Levy's filter requires data in the same frequencies as the data signal, not in the lower frequencies. A low-pass filter in Levy would remove the data used to generate Levy's feedback signal. Applicants are operating on a reflection signal received from objects other than RFID tags. These two error components comprise different frequency spectrum.

To clarify these distinctions, independent Claim 1 has been amended to recite "wherein the reflection signal comprises an error component comprising interrogation signal energy reflected from objects in an environment other than a radio frequency tag" and independent Claim 8 has been amended in a similar fashion. Specifically, Claims 1 and 8 now recite:

1. (Currently Amended): A system, comprising:
 - a transmitter element creating an interrogation signal and transmitting the interrogation signal; and
 - a receiver element receiving and demodulating a reflection signal of the interrogation signal and combining the reflection signal and a feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal, **wherein the reflection signal comprises an error component comprising interrogation signal energy reflected from objects in an environment other than a radio frequency identification tag, and** wherein the feedback signal comprises the at least a portion of radio frequency echo signals **comprising only the error component at the carrier frequency and not side band energy offset from the**

carrier, and wherein the feedback signal is at different frequencies than a data signal of interest.

8. A method, comprising the steps of:

receiving and demodulating a reflection signal comprising an error component at different frequencies than a data signal of interest, wherein the error component comprises interrogation signal energy reflected from objects in an environment other than a radio frequency tag;

deriving a feedback signal from the reflection signal by isolating an error component of the reflection signal through a low pass filter; and
combining the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal.

Accordingly, Applicants respectfully submit this rejection has been traversed, and Applicants respectfully request withdrawal.

2) Claims 10-17 and 19 are rejected under 35 U.S.C. §102(b) as being unpatentable over Levy.

With respect to independent Claims 10 and 14, Examiner states that using a low-pass filter is a matter of design choice and Levy's band-pass filter is thus obvious. Applicants respectfully disagree. The arguments presented above with respect to Claims 1 and 8 apply here with equal force, and Applicants respectfully request Examiner consider them with respect to Claims 10 and 14.

Examiner cites Levy's band-pass filter to read on Applicants' low-pass filter. However, Applicants also include a band-pass filter subsequent to the low-pass filter and the combining of the reflection signal and the feedback signal. Levy fails to disclose this filter and filtering step. Specifically, FIG. 3 in Levy fails to disclose a filter subsequent to the combiner (element 34). Claims 10 and 14 have been amended to clarify this distinction. Specifically, Claims 10 and 14 now recite:

10. A method, comprising the steps of:

demodulating a reflection signal into an in-phase signal and a quadrature signal;
low pass filtering the in-phase signal to isolate an in-phase error signal;
low pass filtering the quadrature signal to isolate a quadrature error signal;
modulating the in-phase error signal and the quadrature error signal to create **an in-phase feedback signal and a quadrature feedback signal**;
combining the **in-phase signal with the in-phase feedback signal and the quadrature signal with the quadrature feedback signal** to cancel at least a portion of radio frequency echo signals in the reflection signal; **and**
band pass filtering each of the combined in-phase signal and in-phase feedback signal and the combined quadrature signal and quadrature feedback signal.

14. A system, comprising:

a demodulator to demodulate a reflection signal into an in-phase signal and a quadrature signal;
a first low pass filter to isolate an in-phase error signal from the in-phase signal;
a second low pass filter to isolate a quadrature error signal from the quadrature signal;
a modulator to modulate the in-phase error signal and the quadrature error signal to create a feedback signal;
a combiner element to combine the **in-phase signal with the in-phase feedback signal and the quadrature signal with the quadrature feedback signal** to cancel at least a portion of radio frequency echo signals in the reflection signal;
a first band pass filter to band pass filter the combined in-phase signal and in-phase feedback signal; and
a second band pass filter to band pass filter the combined quadrature signal and quadrature feedback signal.

Accordingly, Applicants respectfully submit this rejection has been traversed, and Applicants respectfully request withdrawal.

CONCLUSION

Applicants would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

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/Lawrence A. Baratta, Jr./
Lawrence A. Baratta, Jr.
Registration No.: 59,553
Attorney for Applicants

CLEMENTS BERNARD

1901 Roxborough Road, Suite 250
Charlotte, NC 28211 USA
Telephone: 704.790.3600
Facsimile: 704.366.9744
lbaratta@worldpatents.com